International Journal of Current Research and Review
DOI: https://doi.org/10.31782/IJCRR.2024.16202

Research Article

IJCRR
Section: Healthcare

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Surgical Management of Haemorrhoids – A Comparative Study between Harmonic Scalpel and Conventional (Miligan Morgan) Haemorrhoidectomy

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ABSTRACT

Haemorrhoids are one of the common surgical conditions often seen in 4th to 6th decade of life. Although conventional haemorrhoidectomy is the most commonly performed procedure, it has been associated with significant pain and bleeding along with other complications.

Aim/Objective: To compare outcomes of conventional and harmonic scalpel haemorrhoidectomy in the management of grade 3 and 4 haemorrhoids.

Method: The study was a prospective, double blind, randomized study conducted in the department of general surgery, Ispat General Hospital, Rourkela from October 2019 to April 2021. A total of 40 patients were included in this study and divided into group A (Harmonic scalpel) and group B (Conventional haemorrhoidectomy). The data were collected in the post-operative period and statistical analysis was done using SPSS 18.0 and R environment ver.3.2.2. P value <0.05 was considered significant.

Result: The duration of surgery for group A was 17.7±2.17 minutes & for group B was 25.8±1.90 minutes. One patient in group A had significant bleed during surgery compared to 7 patients in group B. The post-operative pain was measured in visual analogue scale. On post op day 1, VAS score for group A and group B was 4.75± 0.64 and 7.75±0.64 respectively. On POD-2 VAS score for both groups were 3.35±0.59 & 5.45 ±0.60 respectively. On POD-7, VAS score for these groups were 1.45±0.60 & 2.85±0.59 respectively. Post-op bleeding was noted in 3(15%) patients in group A and 6(30%) patients in group B. The mean hospital stay was 2.5±0.60 days for group A and 5±1.16 days for group B. In group A, wound was healed in 15 (75%) patients by 2nd week and in rest 5 (25%) patients by 3rd week compared to 12 (60%) patients by 4th week and in rest 8 (40%) patients by 5th week in group B. 1(5%) patient in group A and 2 (10%) patients in group B developed recurrence of symptoms.

Conclusion: Harmonic scalpel can be a better alternative for haemorrhoidectomy with less post-operative pain and bleeding, short hospital stay and faster wound healing.

Key Words: Haemorrhoidectomy, Harmonic scalpel, Miligan-Morgan, Post-operative morbidity, Hospital stay, Recurrence of symptoms.

INTRODUCTION

Haemorrhoids have been described since the beginning of medical history. The first known documentation of symptoms of haemorrhoids being dated around 2250 B.C.[1] These are likely because of downward sliding of the anal cushions, which aid in closing the anal canal during rest. Based on their location in relation to dentate line, Haemorrhoids can be external (distal) or internal (proximal). Internal haemorrhoids are stratified into four grades: First degree is bleeding with no prolapse. Second degree is prolapsed with spontaneous reduction. Third degree is prolapse requiring manual reduction and Fourth degree is prolapsed, cannot be reduced.[16]

Haemorrhoids are common surgical condition occurring in 4.4% of adults with a peak prevalence between 45-65 years of age.[2] The prevalence increases with age until the seventh decade often seen among heavy laborers and occupations requiring prolonged sitting or standing.[2,4,5,6]

Surgical removal is the gold standard treatment for symptomatic grade III and IV haemorrhoids. The most significant complication of hemorrhoid surgery is postoperative pain. The reasons for postoperative pain are related to surgical

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ISSN: 2231-2196 (Print) **ISSN:** 0975-5241 (Online)

Received: 12.11.2023 **Revised:** 04.01.2024 **Accepted:** 23.01.2024 **Published:** 31.01.2024

factors or possible surgical site infection. In conventional methods the haemorrhoidal tissue is removed using scalpel or electrocautery after ligating the pedicle and the defect is either left open or sutured.

The harmonic scalpel has been recently used as part of open and closed haemorrhoidectomy.[3,8,9] It uses ultrasonic vibrations at 55.5 KHz, which simultaneously cuts and coagulates up to 2mm of blood vessels. The relatively low temperatures (80°C) at which it divides tissue reduces lateral thermal injury when compared to both electrocautery and laser. This results in less postoperative pain and decreases the need for narcotic use.

Despite all these described surgical procedures, neither the nature of haemorrhoidal disease nor its treatment has been fully understood and the complications are similar in all these procedures. In this study we have compared the outcomes between conventional and harmonic scalpel haemorrhoidectomy in terms of parameters as described ahead.

MATERIALS AND METHODS

This study was a prospective, double blind, randomized controlled study conducted in the department of general surgery, Ispat General Hospital, Rourkela from October 2019 to April 2021. All patients above 18 years admitted to Ispat General Hospital, Rourkela for treatment of with grade 3 & 4 haemorrhoids were included in this study. Patients with recurrent haemorrhoids, thrombosed haemorrhoids, haemorrhoid with associated inflammatory bowel disease and patients having other associated perianal conditions like fissure, fistula, and abscess were excluded.

Keeping the confidence interval 5% and confidence level of 95%, by applying sample size calculator software from http://www.raosoft.com/samplesize.html, the sample size for my study came as 40. The patients were allocated into 2 groups, Group A (Harmonic scalpel haemorrhoidectomy) and Group B (Conventional haemorrhoidectomy) randomly by using standard randomization method. Clearance required from research and ethical committee was obtained. Patients were admitted one day before surgery and informed consent was taken from all patients. After enrolling appropriate preoperative investigations were done. Both groups were given proctoclysis enema and advised to take bath with soap and water on the morning of surgery. Part preparation of the surgical site and recommended prophylactic antibiotics were administered preoperatively in the operation theatre.

All surgical procedures were performed under spinal anesthesia by the same surgeon who has performed more than 200 cases of haemorrhoidectomy as per standard steps. Ethicon Endo-surgery Harmonic focus was used in group A. The following data were collected from patients in each group using a standard study proforma: duration of surgery, intraoperative hemorrhage, post-operative pain, post-operative bleed, duration of hospital stay, wound healing duration, recurrence of symptoms. For postoperative pain control, each patient was administered IM tramadol 50 mg 2 doses 12 hours apart, followed by oral analgesics as required. Post-operative pain was recorded using a visual analogue scale (VAS). The patients were discharged with oral antibiotics (Tab. Ofloxacin 200mg + Ornidazole 500mg, twice daily), analgesics (Tab. Paracetamol 500 mg) as required, and a stool softener. The patients were advised to continue Sitz baths three times a day. Patients were advised for follow up visit weekly for 6 weeks, then monthly up to 6 months. The wound was evaluated using a five point scale as mentioned in table 1.[25]

STATISTICAL METHODS

Statistical analysis was done using SPSS 18.0 and R environment Ver.3.2.2. P value <0.05 was considered significant.

RESULTS

In our study, both groups were matched with respect to the age (P=0.63) and gender (P=0.465) of the patients. Male: Female ratio was 7:3 in group A and 4:1 in group B. The duration of surgery for group A was 17.7±2.17 minutes & for group B was 25.8±1.90 minutes. (Table 2, 3) The difference was significant (P <0.05). One patient in group A had significant bleed during surgery compared to 7 patients in group B. The post-operative pain was measured in visual analogue scale. On post op day 1, VAS score for group A, group B was 4.75± 0.64 & 7.75±0.64 respectively. On POD-2 VAS score for both groups were 3.35±0.59 & 5.45 ±0.60 respectively. On POD-7, VAS score for these groups were 1.45±0.60 & 2.85±0.59 respectively. (Table 4) There was statistically significant difference between these two groups for post-operative pain. Post-operative bleeding was noted in 3(15%) patients in group A and 6(30%) patients in group B. All of them were managed by keeping soft absorbable hemostatic anal sponges. There was no statistical significance between these two groups (P=0.256). However there was statistically significant difference in both groups regarding hospitalization days. The mean hospital stay was 2.5±0.60 days for group A and 5±1.16 days for group B (P<0.05). Out of 20 patients in group A, wound was healed in 15 (75%) patients by 2nd week and in rest 5 (25%) patients by 3rd week compared to 12 (60%) patients by 4th week and in rest 8 (40%) patients by 5th week in group B. The difference was significant (P <0.05). Among 20 patients in each group only 1(5%) patient in group A and 2 (10%) patients in group B developed recurrence of symptoms. The difference was not statistically significant (P=0.548). (Table 5)

DISCUSSION

Haemorrhoidal disease is a common disorder and about 50% of the people older than 50 years old experience haemorrhoidal symptoms at least for a period of time. Over the years, there has been increasing attention on surgical procedures to treat haemorrhoids. Conventional haemorrhoidectomy first described by Miligan and Morgan is still the most widely used surgical treatment for patients with symptomatic grade III and IV haemorrhoids, However it is associated with significant postoperative complications such as pain, bleeding and mucous discharge. Several comparative studies have been conducted to compare conventional procedures with new surgical techniques, such as haemorrhoidectomy with Harmonic Scalpel or LigaSure to treat grade II, III and IV haemorrhoids which offer less postoperative pain and discomfort.

The Harmonic scalpel is an ultrasonically activated device that uses high-frequency vibrations to cut and coagulate soft tissue. The activated blade can vibrate longitudinally 55,500 cycles per second and induces cavitations and vaporization of the cellular fluid causing precise dissection. The device can cut and coagulate vessels up to 7 mm with lower temperature and minimal thermal spread (<2 mm). This limited spread reduces anal spasms which combined with the simultaneous vessel sealing action of the Harmonic scalpel also reduces the intra-operative blood loss while compared to traditional devices like blades and scissors. Although several procedures have been described for haemorrhoidectomy, harmonic scalpel haemorrhoidectomy may prove efficacious than conventional haemorrhoidectomy.

In present study, we have compared harmonic scalpel haemorrhoidectomy and Miligan Morgan method in terms of parameters mentioned earlier. All the data were recorded as per Performa and analyzed.

Age

In our study, the mean age of the patients was comparable in both the groups, 49.1±8.1 years in group A and 50.4±8.2 years group B. The mean age of the whole study population was 49.75±8.2 years. Maximum numbers of patient were in 41-50 years of age group, youngest being a 36 years old male and the oldest being a 68 years old male. This is comparable with the randomized single blind control study done by Kasthuri Deepak et al.[24] where most of the patients belonged to age group of 41-50 years.

Sex

In group A number of male was 14(70%) and number of female was 06 (30%). In Group B number of male was 16(80%) and number of female was 04 (20%). There was no significant association between gender of the two groups of patients (P=0.465). Our findings are comparable with Tariq Ahmed Mala et al.[21] in which male population in harmonic scalpel group was 76% and female was 24%, while in Miligan Morgan group male and female population was 68% and 32% respectively. The difference was statistically non-significant (P=0.528). The large number of males in the study population is due to higher prevalence of haemorrhoids in males, however the less number of female in comparison to male may be due to the ignorance and reluctance of women in our demographic are to seek medical attention.

Duration of surgery

In our study we found significant difference in duration of surgery between 2 groups (P<0.05). This may be attributed to electro-cautery used with group B which doesn't achieve sufficient vascular coagulation leading to inadequate exposure and a prolonged operation time. This is comparable to study done by BP Ranjan NG et al.[10], Mohamed Aly Elhorbity et al.[12], Amrithraj Thiyagarajan et al.[19], Tariq Ahmed MALA et al.[21]

Intraoperative hemorrhage

In our study, we found significant difference in bleeding during surgery between 2 groups; 5% in group A and 35% in group B (P = 0.01). This may be because of precise dissection and the mechanical pressure exerted by the closed harmonic blades. This is comparable with study done Shady Mohamed Naguib Ghieth et al.[13], Baha Saleh Abdalnby et al.[15], Atul Philipose et al.[20], Tariq Ahmed Mala et al.[21]

Post-operative Pain

In our study, post-operative pain was measured in visual analogue scale. The pain experienced by the harmonic scalpel group was less and the difference was statistically significant (P <0.05). This may be due to factors like the harmonic scalpel blade vibrates instead of passing electric currents, hence less thermal spread. Also no sutures were used and usually no anal packings were needed after surgery. This is comparable to the findings by Mohammad Kazem Shahmoradi et al.[11], Shady Mohamed Naguib Ghieth et al.[13], Hazem A Megahead et al.[14], Safia Zahr Ahmed et al.[16]

Post-operative bleeding

In our Study, There were total 9 (22.5%) cases of post-operative bleeding noted, 3(15%) in group A and 6(30%) in group B. All of them were managed by keeping soft absorbable hemostatic anal sponges. There was no statistical significance between these two groups (P=0.288). Our study is comparable with study done by Baha Saleh Abdalnby et al.[15], Arnab Sarkar et al.[17], Dae Ro Lim et al.[23]

Hospital stay

In our study, Hospital stay for Group A was significantly lower than Group B (P<0.05). This difference may be due to

less post-operative pain, less risk of wound infection, faster wound healing in the harmonic scalpel group. Our findings are comparable to studies done by Safia Zahr Ahmed et al.[16], Arnab Sarkar et al.[17], Dogan Yildrim et al.[18]. However BP Ranjan NG et al.[10], Shady Mohamed Naguib Ghieth et al.[13] and Dae Ro Lim et al.[23] did not found any significant difference in hospital stay though the length of stay was more in the Conventional haemorrhoidectomy group.

Duration of complete wound healing

In our study, the wound healing was significantly faster in group A compared to group B (P <0.05) which is comparable to study done by Mohamed Yehia Elbarmelgi et al.[22] and Kemel Peker et al.[25] This difference may be due to less burning of the tissue, precise dissection, less slough in the post-operative period and lesser wound size when compared to the use of electrocautery.

Recurrence of symptoms

In our study, there was no significant difference (P=0.548) regarding recurrence of symptoms between both the groups. This is comparable to study done by Kazem Shahmoradi et al.[11] However Amrithraj Thiyagarajan et al.[19] in their study found the recurrence in Miligan Morgan group was significantly higher (P<0.005) compared to Harmonic Scalpel group.

CONCLUSION

In our study Harmonic scalpel group took less time for surgery, had fewer days of hospitalization, better and faster wound healing in comparison to conventional group. Due to lateral thermal injury, conventional Miligan Morgan group have more post-operative pain, especially in Postoperative day 1 and 2. Although post-operative bleeding was seen in both groups, there was no statistically significant difference between them. Recurrence of symptoms was seen in very few patients following surgery. There were few limitations to our study such as a small sample size, short term follow up period, relatively short duration of study and lack of data about patient-related factors affecting the healing.

ACKNOWLEDGEMENT

We would like to thank all the staff of the surgery department and the head of our institution for supporting us throughout the study.

Source of Funding:

No financial support has been obtained for this study.

Conflict of Interest:

We have no conflict of interest to disclose.

Authors' Contribution:

1st Author: Concept, Design, Literature search, Data acquisition, Manuscript preparation, Manuscript review.

2nd Author: Design, Literature search, Data analysis, Statistical analysis, Manuscript edit, Manuscript review.

3rd Author: Data acquisition, Literature search, Data analysis, Manuscript edit, Manuscript review.

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Table 1: Grading Scale for Wound Healing

Grade	State of wound
1	Sloughy
2	No Granulation
3	Granulating
4	Epithelializing
5	Completely Epithelialized

Table 2: Age distribution of patients studied

Age group (in years)	Group A	Group B	Total
21-30	0	0	0
31-40	1(5%)	2(10%)	3(8%)
41-50	14(70%)	12(60%)	26(65%)
51-60	3(15%)	4(20%)	7(18%)
61-70	2(10%)	2(10%)	4(10%)
Total	20(100%)	20(100%)	40(100%)
Mean ± S.D.	50.4±8.2	49.1±8.1	

Table 3: Gender distribution of patients studied

Gender	Group A	Group B	Total
Male	14(70%)	16(80%)	30(75%)
Female	6(30%)	4(20%)	10(25%)
Total	20(100%)	20(100%)	40(100%)

Table 4: Showing distribution of patients with post op. pain on POD-1, POD-2, POD-7

POST OP. DAY	Group A	Group B	P-VALUE
POD-1	4.75±0.64	7.75±0.64	<0.05,SIGNIFICANT
POD-2	3.35±0.59	5.45±0.60	<0.05,SIGNIFICANT
POD-7	1.45±0.60	2.85±0.59	<0.05,SIGNIFICANT

Table 5: Incidence of recurrence of symptoms among both groups

Recurrence of symptoms	Group A (n=20)	Group B (n=20)
YES	1(5%)	2(10%)
NO	19(95%)	18(90%)